H Block (1915-1920/1995-2000 MHz) Issues

ET Docket No. 00-258

CTIA – The Wireless Association™
Presentation to
Sam Feder
Office of Commissioner Kevin J. Martin
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Overview

• Prior to allocating 1915-1920/1995-2000 MHz for any mobile services, the Commission must ensure that adjacent licensees are protected from harmful interference.

• Allocation of an H block for a PCS-type service raises interference concerns.

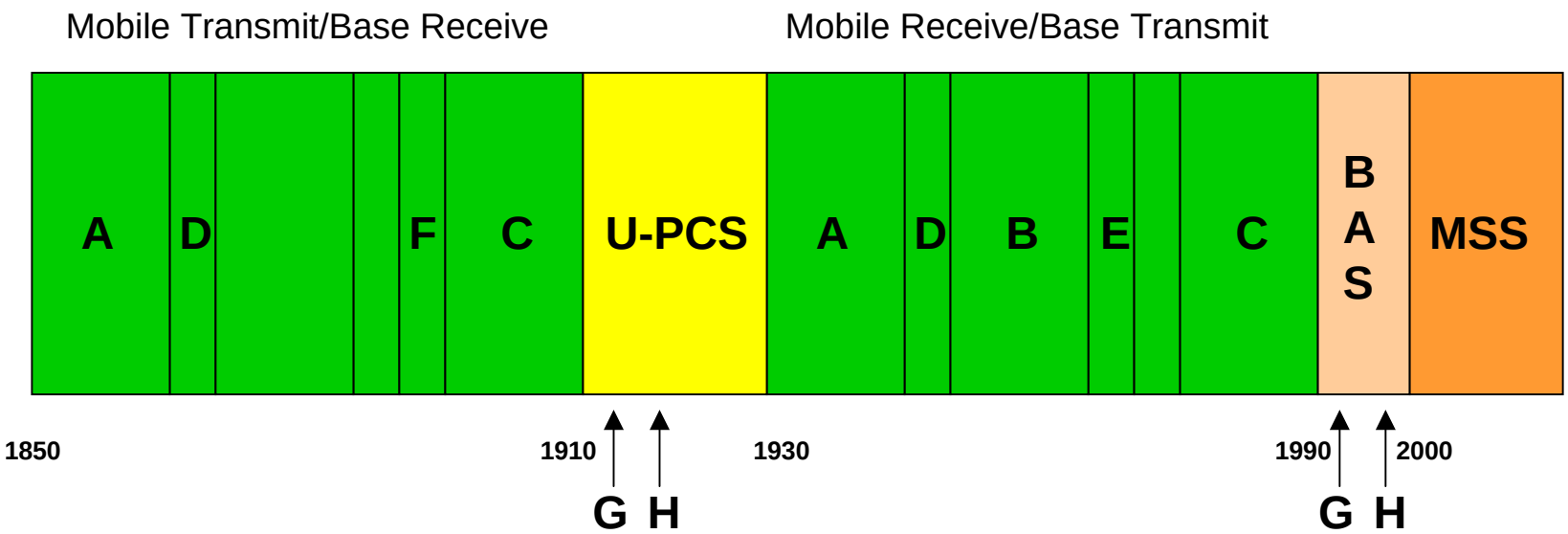
- Out-of-Band Emissions (OOBE) – OOBE would need to be limited consistent with industry standards (*i.e.*, -76 dBm/MHz).
- In-Band Overload –
  - Without adequate testing, the Commission cannot be confident what safeguards will protect legacy PCS handsets from overload.
  - The overload problem must be adequately addressed before 1915-1920/1995-2000 MHz can be used for a terrestrial mobile service.

Consumers Must Be Protected From Harmful Interference

- Consumers depend on high-quality mobile services for personal, commercial, and emergency communications. PCS licensees have invested billions with the expectation that they will be able to satisfy consumer demand for high-quality, dependable services.
- Because CMRS networks operate with such a high degree of efficiency, the potential costs of interference are significant. Therefore, any potential interference resulting from new spectrum allocations must be taken seriously.
- Policymakers at all levels have emphasized the benefits of high service quality. The Commission should take care not to adversely affect consumers' satisfaction or the safety/reliability of mobile services.
- In the context of the 1915-1920/1990-1995 MHz allocations, more testing is appropriate prior to determining which services are best suited for this spectrum block.

Evolution of PCS Standards

PCS Band Plan



- Original PCS bandplan designed to maximize spectral efficiency and minimize harmful interference.
- Close proximity of band segments provided technical challenges.
- Commission is considering adding an H block, which presents significant technical issues.

Evolution of PCS Standards

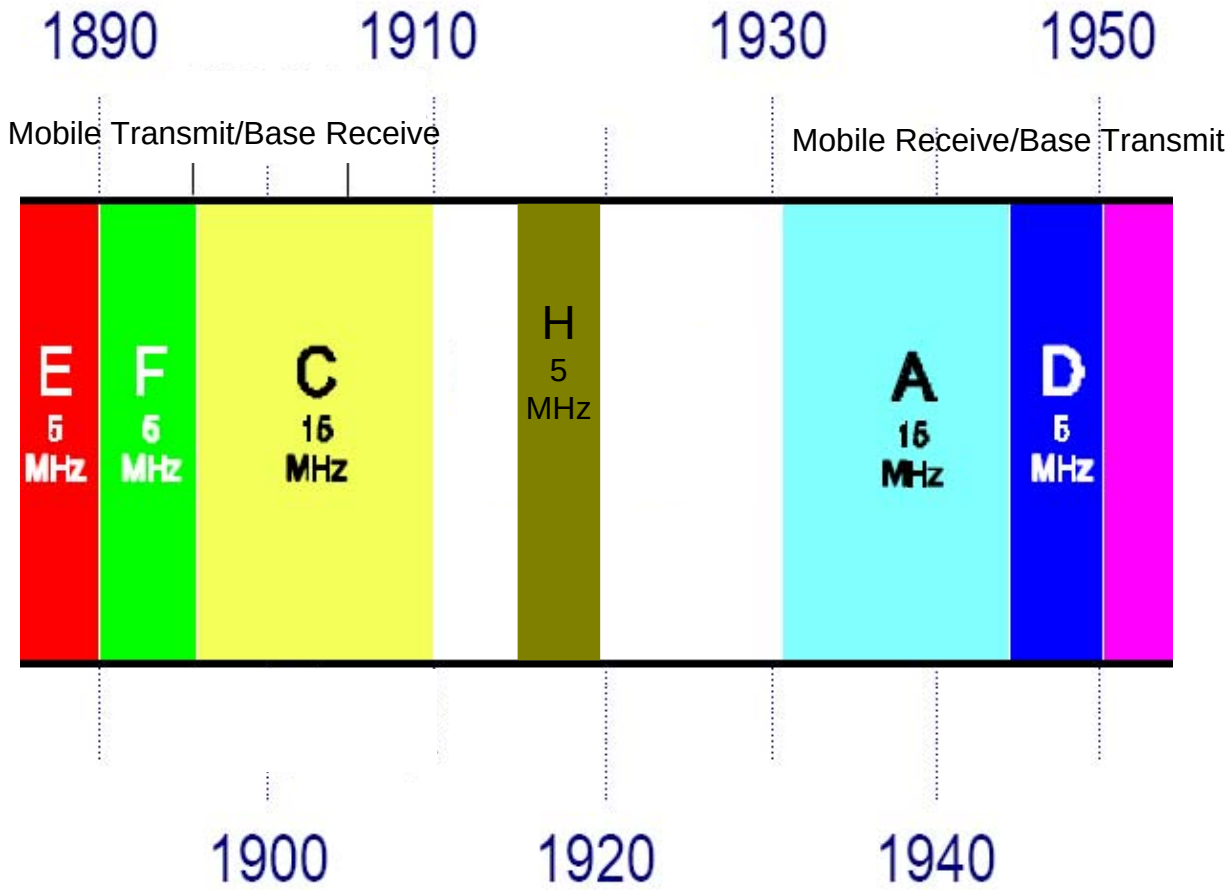
Design Parameters to Avoid Interference

- Industry has adopted stringent handset design parameters to limit the emissions of PCS mobiles into the mobile receive band. Two ways of achieving this result:
  - Out-of-Band Emissions (OOBE) limit prevents handsets from inadvertently transmitting energy outside assigned frequencies.
  - Installation of duplex filters in handsets that prevent or block receipt of signals from outside the assigned frequencies (preventing “overload” conditions).
- Design parameters of today’s handsets enable duplex operations and non-interfering operation of two mobiles within one meter of one another.

OOBE Problem

- H block has potential to produce harmful OOBE to existing PCS operations.
- Requiring H block handsets to meet the industry standard, -76 dBm/MHz, OOBE limit would meet the 1 meter design requirement.
- -76 dBm limit is based on 1dB degradation which already results in significant impact to the cost and coverage of incumbent CMRS networks.

In-Band Problem



- Proximity of H block to mobile receive band prevents the existing receive filters from effectively preventing or blocking in-band signal.

In-Band Problem

- Filters in today's PCS handset receivers were designed to reject strong signals from nearby transmitters in the top of the C block, but were not designed to reject strong signals from nearby handset transmitters in the H block.
  - This is a one way problem. H block would impair existing PCS handsets, but not vice versa.
- As a result, H block mobile transmitters can overload other PCS mobile receivers. Such overload will impair all existing PCS handsets, including those currently being manufactured, through several mechanisms, such as *desensitization* and *intermodulation*.
  - Addressing this problem through improved filtering in PCS handsets would require replacement of all existing phones using the PCS band. Existing filter technology would require more complex filtering that would significantly increase the size and cost of wireless phones and reduce their battery life. These costs would be entirely borne by PCS licensees and their customers.
- Testing is the best way to find out what safeguards would protect PCS handsets from interference from H block mobile transmissions.

In-Band Problem

- The impact of H block operations on existing handsets can be calculated based on the theoretical or specified performance of duplexers. These calculations indicate that a handset operating on the H-block will impair the function of nearby PCS handsets.
- Testing the impact of H-block transmissions on real handsets will answer questions regarding the severity of such impairments, the mix of susceptibility and resistance among current handsets, and the separation distance at which H-block operations impose negligible harms.

What's the Potential Impact?

- Impact on Subscribers:
  - Lost Calls, distorted audio, inability to make and/or receive calls, inability to determine location (E-911), lower data rates.
- Impact to Networks:
  - Capacity loss, coverage loss.
- Will occur wherever PCS signals are moderate to weak and callers are in close proximity to an H block mobile device operating at or near full power:
  - Indoors (lower floors of buildings, public locations)
  - Inside vehicles (trains, buses)
  - Rural and fringe areas

Summary of H Block Issues

- The Commission should not allocate or license 1915-1920 / 1995-2000 MHz band for services (*e.g.*, mobile) in a way that would cause harmful interference to existing PCS systems.
  - The Commission should adopt the interference criteria set forth in PCS industry standards -- *i.e.*, an OOBE limit of -76 dBm/MHz.
  - The Commission should delay the allocation order to allow time for testing to determine the feasibility of imposing power limits on H block licensee handsets or other safeguards to protect legacy PCS handsets from the overload problem. Testing also may reveal other unforeseen problems. CTIA has discussed with OET a plan for third party testing.
- If required safeguards would make the H Block undesirable for PCS-type services, the Commission should consider use of the band for low-power unlicensed devices or licensed services that will not cause harmful interference to PCS (*e.g.*, Air-to-Ground).